

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed March 25, 2005. Upon entry of the amendments in this response, claims 25-29, 31-37, 41-45, and 47-53 remain pending. In particular, Applicant has amended claims 25, 31, 36-37, 41, 47 and 52-53, has added claims 63-64, and has cancelled claims 35 and 46 without waiver, disclaimer or prejudice. Independent claims 25 and 41 have been amended to incorporate features of dependent claims 35 and 46. Specifically, claims 25 and 41 have been amended to incorporate the features of "wherein the heat spreader has a shape of an inverted square pie tin having an elongated surrounding lip mounted over the ball grid substrate" and "the heat spreader has a (sidewall) surface exposed to a surrounding ambient, not contacting the mounding compound and the thermal grease". Support for the amended claim language amendments can be found in at least Figs. 2A and 3A, and accordingly Applicants submit that no new matter is added thereby. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

Objections to the Drawings

The Office Action objected to the drawings under 37 C.F.R. 1.83(a). In this regard, Applicant had amended the specification to add the reference numbers that were presented in the drawings but not previously mentioned in the specification. Therefore, Applicant respectfully asserts that no new matter has been added by the present amendments.

Objections to the Claims

The Office Action objected to claims 31 and 47 as being of improper dependent from or failing to further limit the subject matter of a previous claim. As set forth above, Applicant has amended these claims and respectfully asserts that the objection has been accommodated.

Rejections under 35 U.S.C. 112

The Office Action rejected claims 25 and 41 under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. The Office Action alleged that there was no support for the thermal grease comprising silicon rubber that contains heat-conduction particles, epoxy resin, curing agent, a catalyst, a coupling agent, a filter, a flame retardant, a mold-release agent, a color agent and a stress-relief agent (of claims 25 and 41). Applicant has amended these claims to correct as follows: “the thermal grease comprising silicon rubber that contains heat-conduction particles, ~~epoxy resin, curing agent, a catalyst, a coupling agent, a filter, a flame retardant, a mold-release agent, a color agent and a stress-relief agent~~”.

For at least this reason, Applicant respectfully asserts that the objection has been accommodated.

Rejections under 35 U.S.C. 103

The Office Action rejected claims 25, 29 and 31 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri*, and further in view of *Uchida et al.* The Office Action also rejected claims 26, 27, 34 and 35-37 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and further in view of *Long*. The Office Action also

rejected claim 28 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and further in view of *Culnane*. The Office Action rejected claims 32 and 33 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and further in view of *Primeaux*. The Office Action rejected claims 41, 45, and 47 under 35 U.S.C. 103(a) as alleged unpatentable over *Juskey* in view of *Khatri* and *Uchida et al.*, and further in view of *Lee*. The Office Action rejected claims 42, 43, 50 and 51-53 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and in view of *Lee* and further in view of Long. Also, the Office Action rejected claim 44 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and in view of *Lee* and further in view of *Culnane*. Additionally, the Office Action rejected claims 48 and 49 under 35 U.S.C. 103(a) as allegedly unpatentable over *Juskey* in view of *Khatri* and in view of *Lee* and further in view of *Primeaux*. Applicant respectfully traverses the rejections.

With respect to claim 25, that claim (as amended) now recites:

25. A heat spreader ball grid array package, comprising:
a ball grid substrate;
a semiconductor chip affixed to the ball grid substrate;
a mounting compound encasing the semiconductor chip over the ball grid substrate;
a heat spreader mounted over the ball grid substrate and spaced apart from the molding compound to form a gap; and
thermal grease within the gap at least between the heat spreader and the molding compound, wherein the thermal grease comprises silicon rubber containing heat-conducting particles, ***the heat spreader has a shape of an inverted square pie tin having an elongated surrounding lip mounted over the ball grid substrate and the heat spreader has a surface exposed to a surrounding ambient, not contacting the mounding compound and the thermal grease.***

(Emphasis Added).

Applicant respectfully asserts that the recited references, either individually or in combination, are legally deficient for the purpose of rendering claim 25 obvious. Specifically, Applicant respectfully asserts that none of *Juskey*, *Khatari*, *Long*, or *Uchida et al.* teaches or reasonably suggest at least the feature/limitations emphasized above in claim 25 which is good for dispersing heats induced by the semiconductor chip from the heat spreader since no other materials are formed on an exposed surface thereof. Therefore, Applicant respectfully asserts that claim is in condition for allowance. Since claims 26-29, 31-34 and 36-37 are dependent claims that depend from claim 25 either directly or indirectly. Applicant respectfully asserts that these claims also are in condition for allowance.

With respect to claim 41, the claim recites:

41. A heat spreader ball grid array package, comprising:
a ball grid substrate;
a semiconductor chip affixed to the ball grid substrate;
a molding compound encasing the semiconductor chip over the ball grid substrate;
thermal grease over the molding compound, wherein the thermal grease comprises silicon rubber containing heat-conducting particles;
a heat spreader mounted over the ball grid substrate, the molding compound and the thermal grease; and
a PCB substrate or a stiffener mounted to the heat spreader, *wherein the heat spreader has a shape of an inverted square pie tin having an elongated surrounding lip mounted over the ball grid substrate, and the heat spreader has a sidewall surface exposed to a surrounding ambient, not contacting the mounding compound and the thermal grease.*

(*Emphasis Added*).

Applicant respectfully asserts that the recited references, either individually or in combination, are legally deficient for the purpose of rendering claim 41 obvious. Specifically, Applicant respectfully asserts that none of *Juskey*, *Khatari*, *Long*, or *Uchida et al.* teaches or reasonably suggest at least the feature/limitations emphasized above in claim 41 which is good


for dispersing heats induced by the semiconductor chip from the heat spreader since no other materials are formed on an exposed sidewall surface thereof. Therefore, Applicant respectfully asserts that claim is in condition for allowance. As claims 42-45, 47-50 and 52-53 are dependent claims that depend from claim 41 either directly or indirectly. Applicant respectfully asserts that these claims also are in condition for allowance.

Therefore, Applicants respectfully submit that the rejection can be withdrawn and requests that a timely Notice of Allowance be issued in this case.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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